Engineering in Liberal Education and Liberal Education in Engineering

GUIDING PRINCIPLE

Lower the threshold for entry (but not the exit!) by mixing engineering with the larger world

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http://engineering.dartmouth.edu/courses/08spring/engs021
Seven Liberal Arts

- Grammar
- Logic
- Rhetoric
- Geometry
- Arithmetic
- Astronomy
- Music

Classic Education and Examination
General Education

- English & Seminar
- Foreign Language
- Art
- Literature
- Phil/Hist/Religion
- International Study
- Social Analysis
- Deductive Science
- Natural Sciences
- Tech & Applied Sci

Liberal Education and Examination

Gods of the Modern World by José Clemente Orozco

http://www.dartmouth.edu/~library/Orozco/part2.html
General Education

- English & Seminar
- Foreign Language
- Art
- Literature
- Phil/Hist/Religion
- International Study
- Social Analysis
- Deductive Science
- Natural Sciences
- Tech & Applied Sci
Technology and Applied Science

- Everyday Technology
- Technology of Sailing
- Materials: The Substance of Civilization
- Healthcare and Biotechnology in the 21st Century
- Technology and Biosecurity
- Technology, Society, and Security in the Current Era
- The Materials Revolution
- Technology: Boon or Bane?
- Energy Technology and Public Policy
- Introduction to Technology
- Nanotechnology
- Biomedical Informatics
- Technologies in Homeland Security
- Design Thinking
- Virtual Medicine and Cybercare
- Introduction to Engineering

Great issues
- Technological dimension
- Historical depth
- Ethical dilemma
- Importance for future

Design for human need

Novelty at boundaries

Holistic engineering

http://engineering.dartmouth.edu/undergraduate/courses
Technology and Applied Science

- Everyday Technology
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ENGS 21: Introduction to Engineering

- Design for human need
- Engineering problem solving method
- Analyze, experiment, test
- Use modern tools
- Patent, market, literature searching
- Economics, liability, ethics
- Marketing
- Product design
- Communication!
- Teamwork, project management
- Sustainable development
- Lifelong learning
Methodology

Objectives

“Clean Technology”

Evaluate problem
Identify Need
Explore solutions
Design
Fabricate
Test
Venture plan

http://engineering.dartmouth.edu/courses/08spring/engs021
Design Expectations

- Justify need and constraints
- Design to appropriate specifications
- Develop a prototype
- Test the prototype
- Develop a venture proposal
- Assess sustainable design features
- Present the prototype and venture proposal to the Review Board

Milestones

- White paper
- Proposal
- Progress report
- Final report
"It's the journey, not the top of the mountain."

<table>
<thead>
<tr>
<th>Year</th>
<th>Patent Description (granted and provisional)</th>
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<tbody>
<tr>
<td>2006</td>
<td>Night runner belt light</td>
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<tr>
<td>2004</td>
<td>Gyroscopic stabilization of a bicycle</td>
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<tr>
<td>2005</td>
<td>Device to learn tone control in wind instruments</td>
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<tr>
<td>2005</td>
<td>Retrofit device for rollerski</td>
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<tr>
<td>2005</td>
<td>Adjustable length/collapsible crutch</td>
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<tr>
<td>2003</td>
<td>Exercise bike connected to video game</td>
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<td>2004</td>
<td>Rescue sled for ski slopes</td>
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<td>2003</td>
<td>Dripless gasoline nozzle</td>
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<td>2003</td>
<td>Wireless energy transfer for implantable device</td>
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<td>2002</td>
<td>Wireless panic button for use in wireless networks</td>
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<td>2002</td>
<td>Snowboard binding with reduced vertical profile</td>
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<td>2001</td>
<td>Knee brace for muscular atrophy</td>
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<td>1997</td>
<td>Halogen torchiere light</td>
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<tr>
<td>1964</td>
<td>Water filtration technology using reverse osmosis</td>
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http://engineering.dartmouth.edu/entrepreneurship/history.html